COSMO™ SYNTHESIZER

CZ-230S

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OPERATION MANUAL 1
MANUAL DE OPERACION 51

CASIO

COSMO SYNTHESIZER

CZ-230S

Congratulations upon your selection of a CASIO CZ-230S. The CZ-230S is a state-of-the-art musical instrument which incorporates the latest electronics technology to make its operation as easy as possible. Exceptional sound quality backed up by a host of sophisticated features and functions makes the CZ-230S a joy to play for everyone. In order to enjoy the features and functions of the CZ-230S to their fullest, be sure to carefully read this manual and follow the instructions contained herein.

CONTENTS

■ SUMMARY OF FEATURES

(1) FEATURES AND FUNCTIONS

The features and functions of the CZ-230S can be broadly divided into four major classifications.

①GENERAL

- 100 preset voices to choose from.
- 20 preset rhythms to match virtually any type of music.

②RHYTHM MODE

- Pattern memory mode for storage of up to 30 measures of rhythm patterns in memory.
- Pattern play mode for playback of stored rhythm patterns.
- Song memory mode for storage of compositions created by joining rhythm pattens together.
- Song play mode for payback of songs created using the song memory mode.

③MT MODE

- Save function stores pattern and song rhythm data on cassete tape.
- Verify function confirms accuracy of data saved on cassette tape.
- Load function recalls data stored on cassette tape into the keyboard.

④MIDI MODE

POLY MODE — Normal MIDI send/receive immediately after power is switched ON.

- Data send/receive capabilities of a polyphonic synthesizer (up to 8 notes).

MONO MODE — Special MIDI receive mode with 4 independent sound sources.

- Each channel can receive 4 channels of timbre data for the equivalent of four separate monophonic synthesizers.

(2) KEYBOARD

The CZ-230S has 49-key, 4-octave keyboard capable of producing chords of up to 8 notes 8-note polyphonic). However, the number of notes produced is affected by the timbre selected and functions applied as follows.

• Play without programmed rhythm playback

Selecting 1 DCO for a prese voice results in 8-note polyphonic, while 2 DCO results in 4-note polyphonic.
*All timbes become monophonic when the SOLO key is ON.

• Programmed rhythm playback

When PD sound source timbres are input to at least one of the PD lines from 1 through 3, the keyboard becomes monophonic during rhythm pattern payback. The keyboard cannot be used during rhythm patten playback when line 4 is used.
*With rhythms programmed using the PCM rhythm sound sources only, the keyboard operated as noted for the NORMAL MODE during rhythm playback.

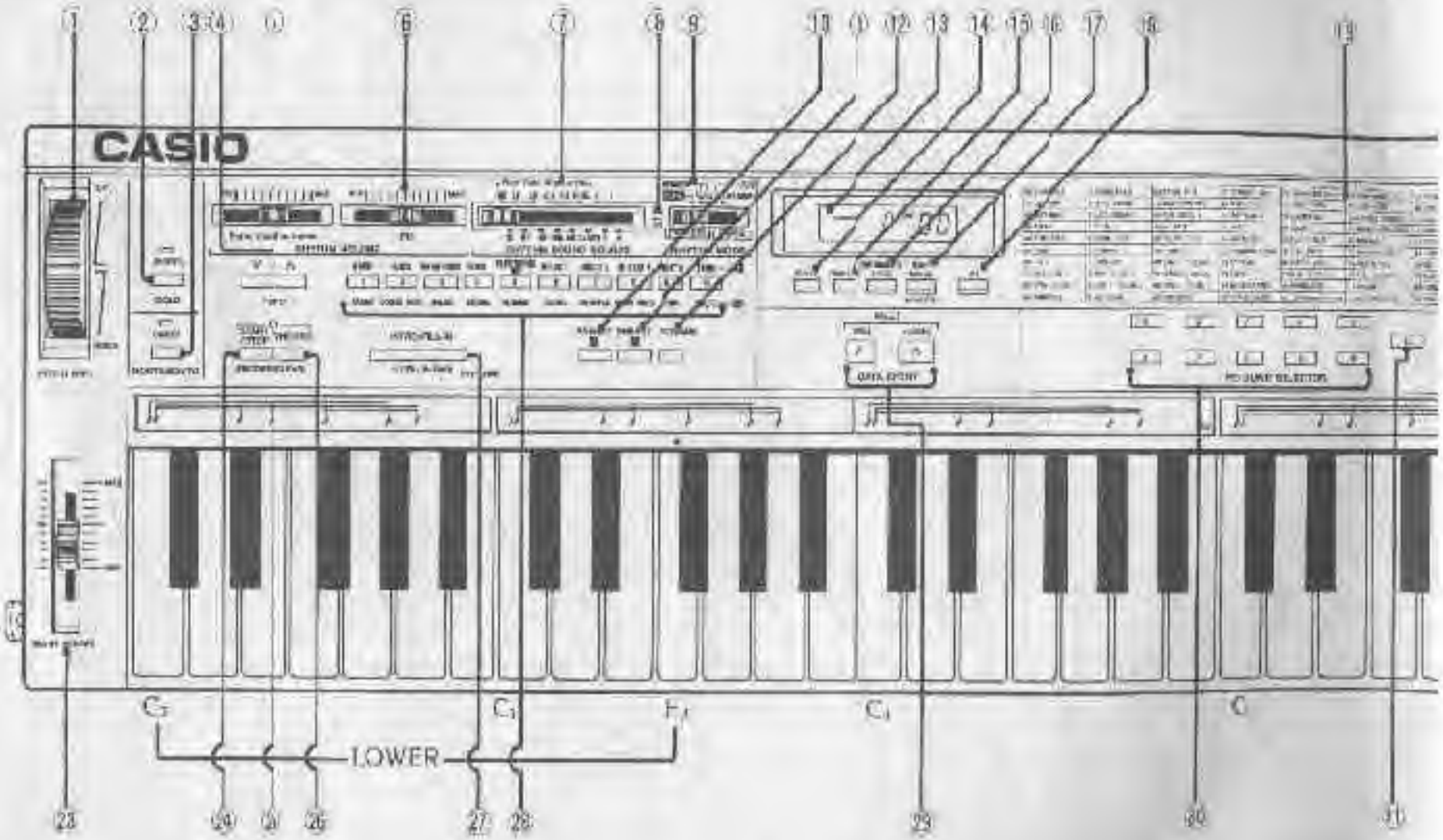
	MAXIMUM NUMBER OF NOTES		
	1 DCO TIMBRE (SOLO OFF)	2 DCO TIMBRE (SOLO OFF)	SOLO ON
1 Normal state	8	4	1
2 Playback of rhythm pattern with notes present in at least PD line from 1 through 3	1	1	1
3 Playback of rhythm pattern with notes present in PD line 4	8	4	1

NOTE

- The keyboard becomes monophonic when the unit is set to the MIDI MONO mode (see page 44).
- The term LOWER KEYBOARD (C_2 – F_3) as used in this manual is defined as the range of the keyboard which starts auto rhythm play when synchro start is set.
- The keyboard is used for setting note timing during rhythm pattern memory programming. It also loses its normal keyboard functions during the song memory modes.

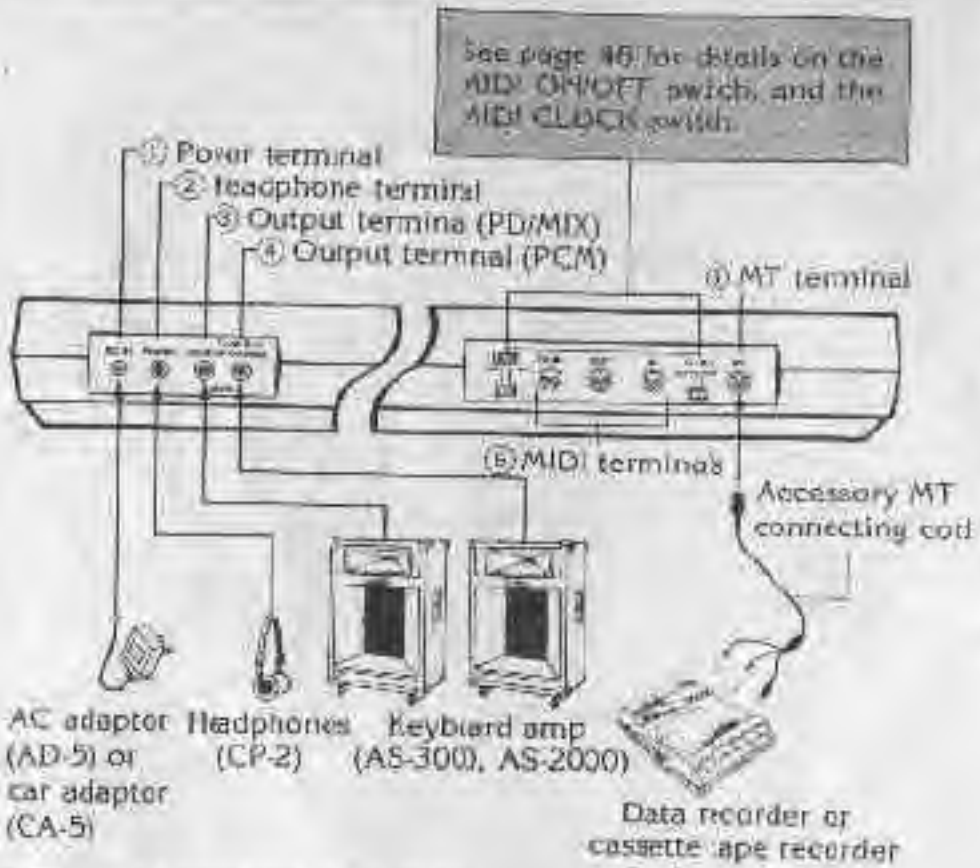
■ GENERAL GUIDE

(1) FRONT PANEL



① Pitch bend wheel
② Solo key
③ Portamento key
④ Tempo key
⑤ PCM volume
⑥ PD volume
⑦ Sound source selector
⑧ PD indicator
⑨ Rhythm mode selector
⑩ Preset 1 key
⑪ Preset 2 key
⑫ Program key
⑬ Display
⑭ MIDI CH key
⑮ Transpose key
⑯ Portamento time key
⑰ Bend range key
⑱ MT key
⑲ PD sound list (00 – 99)
⑳ Tuning control
㉑ Power switch
㉒ Power indicator
㉓ Main volume
㉔ Start/stop key
㉕ Tempo indicator
㉖ Synchro key
㉗ Intro/fill-in key
㉘ Rhythm selector
㉙ Value key
㉚ Ten-key pad
㉛ Cancel key
㉜ Speaker

(2) REAR PANEL



①Power terminal (9V DC)

For connectionof an optional AC adaptor (AD-5)or car adaptor (CA-5).

②PHONES (Headphone jack)

For connectionof optional headphones (CP-2). Output from the speakers isautomatically cut when headphones are connected.

③PD/MIX ④PCM (Output terminals)

For connection of an optional keyboard amplifier (AS series) or home audio system for better amplification of output. Connecting amplifiers to both thePD/MIX and PCM terminals outputs PD sound source timbres from PD/MIX and PCM sound source rhythms from PCM. Connecting only PDMIX mixes and outputs bothPD sound sourcetimbres and PCM sound source rhythms.

⑤MIDI terminals (IN/OUT/THRU)

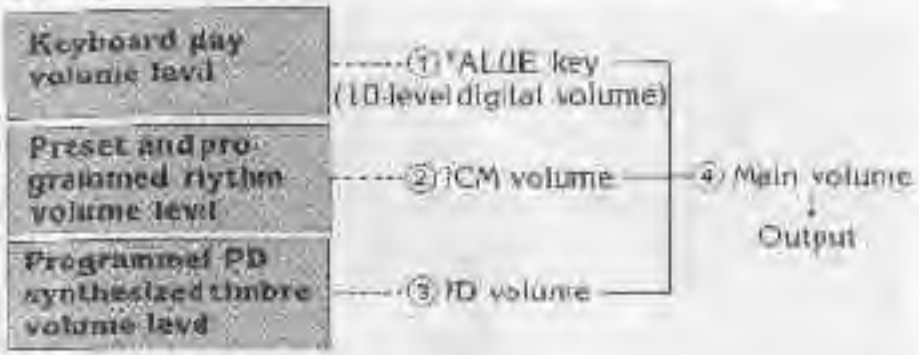
For connection with another MIDI device.

⑥MT terminal

For connection of a commercially available tape recorder or cassette taperecorder. This makes it possible to save pattern and song data on cassette tapes for later recall. Connections are made using the accessory MT connecting cord.

(3) VOLUME CONTROL

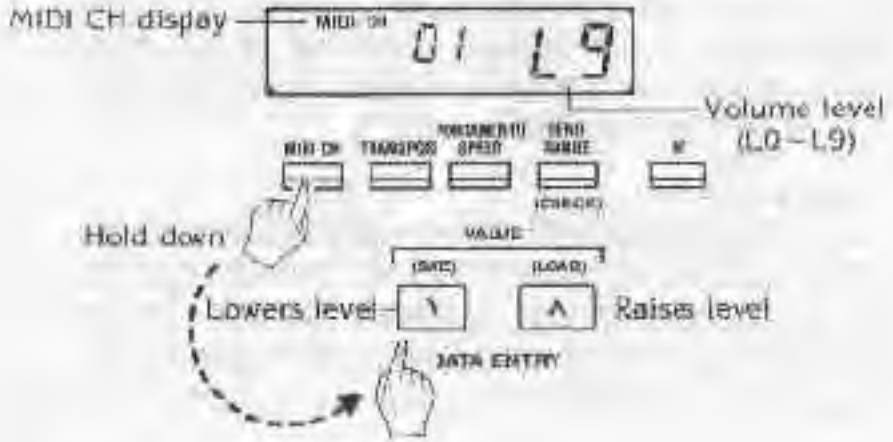
The CZ-230Sallows independent control of volume for preset rhythms, programmed rhythms, and programmed PD sound sources. Overall volume canbe set using the main volume control.



①VALUE KEY

Press the MIDI CH key twice and the display should appear as illustrated bcow to show the current volume level. The volume level can be adjusted using the VALUE V Λ keys while still holding down the MIDI CH key.

*Press only once if MIDI CH display is already shown.



- The numeric value decreasesby one with each press of VALUE V and increases by one with each press of VALUE Λ. Holding down ether key causes high speed continuous change of the value.
- Volume level can be set to one of 10 levels in the range L0 (min) – L9 (max). Pressing the keyboard resuts in no output at all when volume is set to L0.
- Preset volume levels are retained even when the power of the unit is switched OFF.

②PCM VOLUME

Slides left and right to adjust the rhythm volume level.

③PD VOLUME

Slides left and right to adjust programmed PD sound source timbre volume.

(4) TUNING

The overall pitch of the CZ-230S can be adjusted within the range of ± 00 cents (± half-tone). The standard setting for the keyboard is A4 = 442Hz, and each press of TUNING V lowers pitch while pressing TUNING Λ raises pitch. Holding down either key causes high speed continuous change of pitch.

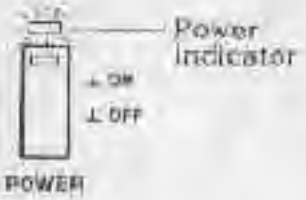
- Simultaneously pressing the TUNING V Λ keys automatically returns to the original value (A4 = 442Hz).

■ POWER SUPPLY

(1) DC POWER

•Dry cells

This unit can be powered by six D-size (SUM-1) manganese dry cells. Weakened batteries will result in lower volume or poor tonal quality. The power indicator will flash as battery power weakens. At this time, replace all 6 batteries as soon as possible.



•Battery replacement

1. Slide open the battery compartment cover on the bottom of the unit and remove the weakened batteries.
2. Load a newset of batteries ensuring that polarity is correct.

*Replace all six batteries to ensure long battery life.

Perform the following initialization routine after loading batteries for the first time or if batteries are ever removed from the unit for longer than 10 minutes.

<Initialization routine>

Press the power switch to switch the power of the unit ON while holding down the CANCEL key.

•The initialization routine is required to delete any bugs which may be generated within the memory during extended storage without batteries loaded.

Approximately 3.5 hours of battery life are provided by high performance (SUM-1) batteries. Battery life is extended to approximately 1 year if main power is supplied by household current (100, 117, 220-240V AC) or a car battery, and batteries are used for memory back-up only.

(2) ADAPTORS

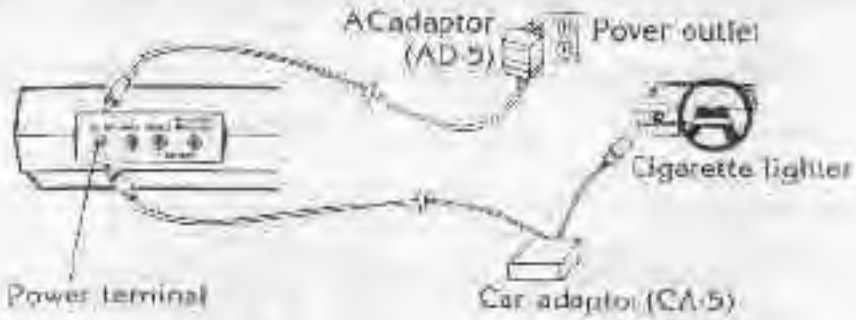
<AC power>

An optional AD-5 AC adaptor is required to connect the unit to an AC outlet. The voltage rating of the adaptor (100, 117, 220, 240V) must match the power supply to which the unit is connected to avoid damage to internal circuitry. Batteries should also be loaded for memory back-up even when AC power is used for the main power supply.

<Car battery>

This unit can also be powered through an automobile's cigarette lighter by using an optional CA-5 car battery adaptor. Batteries should also be loaded for memory back-up even when car battery power is used for the main power supply.

<CZ-230S rear panel>



Memory back up is not performed if batteries are not loaded when using adaptor. Therefore, the FORCED POWER OFF function mentioned below cannot be activated.

- Be sure to switch power OFF whenever connecting or disconnecting adaptors.
- Remove batteries when the unit is not used for extended periods to avoid damage caused by battery leakage.
- Use only the Casio AC adaptor specified for this unit. Using another type of adaptor can damage the unit.
- The adaptor normally becomes warm when connected to an AC outlet. Disconnect the adaptor whenever possible, especially if the unit is not used for extended periods.

(3) AUTO POWER OFF FUNCTION

An automatic power cut off function activates approximately 6 minutes after the last key operation. Power supply can be restored by switching the powerswitch OFF and then ON again.

- The auto power off function does not operate during MIDI receipt of external messages even though the keyboard or switches are not operated.

(4) MEMORY BACK-UP

All memory data, including rhythm program patterns are retained by memory back-up batteries even when the main power supply is switched OFF. However, memory contents can be lost or altered if the batteries lose their power.

- Memory contents are retained even when batteries are removed for replacement and new batteries are loaded within 10 minutes.
- The following data is retained by the back-up batteries when the main power is switched OFF:

① **Programmed rhythm pattern (up to 30) data**
*Including 4-line PD sound source timbres.
② **Programmed song data (1 song of rhythm)**
③ **Portamento speed**
④ **Transpose**
⑤ **MIDI channel**
⑥ **MIDI MONO mode 4-channel timbres**
⑦ **Tuning**
⑧ **Internal 4-timbre data**
⑨ **Keyboard volume levels (digital volume values)**
⑩ **Tempo**
⑪ **Bend range**

(5) FORCED POWER OFF

This function switches the main power supply OFF before battery power reduces to the point where memory data would be lost. Should this situation occur, replace the power supply batteries with a new set.

(6) INITIAL STATUS

The following is the initialized status of the unit when power is switched ON.

① **Power indicator lit**
*Blinking indicates weakened battery power.
② **Preset voice No. 00 (BRASS ENS 1) set**
③ **Rhythm stopped**
④ **Portamento and solo OFF**

All other data are set according to values in effect when power was switched OFF.

(7) INITIALIZED MEMORY DATA

The initialization routine outlined on page 9 sets the built-in memory data as shown below. Note that the initialization routine also deletes all rhythm pattern and song data from memory.

DATA TYPE	SETTING
Programmed rhythm pattern	Preset rhythm (1) pattern
Song	Preset rhythm (1) in series
Pattern memory PD sound source timbres	PD1 – 4 assigned to preset voice Nos.00 – 03
Portamento speed	30
Transpose	0 (C)
MIDI channel	01
MIDI MONO mode 4-channel timbre	No.00 timbre, all 4 channels
Tuning	A4 – 442Hz
Internal 4-timbre data	Sound Nos.96 – 99
Keyboard volume level	L9
Tempo	20 (♩= 96)
Bend range	02

*All synthesized timbre patterns (PD1 – 4) are set to rests, and the key is set to C_4.

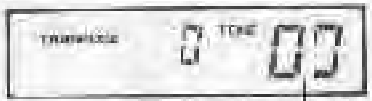
■ PRESET VOICES

The CZ-230S features a total of 100 different voices produced by the PD sound source.

(1) PLAY

①Set the RHYTHM MODE selector to PATTERN PLAY.

②Switch the power of the unit ON.



Timbre number 00

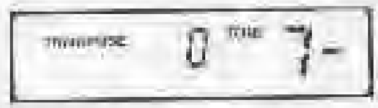
③Use the tenkey pad to enter the desired timbre number.
*Timbre numbers are noted on the PD sound list printed on the keyboard panel.

00 BRASS ENS.1	01 BRASS ENS.2	02 BRASS ENS.3	03 SYMPHONIC ENS.1	04 SYMPHONIC ENS.2
05 SYMPHONIC ENS.3	06 STRING ENS.1	07 STRING ENS.2	08 SYNTH. ENS.1	09 SYNTH. ENS.2
10 FAIRY WIND	11 WARM SOUND	12 SOUTHERN WIND	13 MAGICAL WIND	14 FUNKY HORN
15 SLAP HORN	16 SWEET STRINGS*	17 LIGHT ATTACK	18 SYNTH. HARP*	19 METALLIC SOUND
20 JAZZ ORGAN 1	21 JAZZ ORGAN 2	22 PIPE ORGAN 1	23 PIPE ORGAN 2	24 ACCORDION
25 SMALL CHORUS	26 SMALL CHORUS 2	27 SYNTH. VOICE 1	28 SYNTH. VOICE 2	29 WAH VOICE
30 TRUMPET	31 FLUTE	32 WHISTLE	33 VIOLIN*	34 CELLO
35 BLUES HARMONICA	36 SHAKUHACHI	37 KOTO	38 SHAMISEN	39 [illegible]
40 SYNTH. REED	41 [illegible]	42 DOUBLE REED	43 NEON ATTACK	44 SOFT ATTACK
45 FANTASY 1	46 FANTASY 2	47 PLUNK SOUND	48 SLASH REED*	49 SYNTH. SITAR
50 PIANO 1	51 PIANO 2	52 PIANO 3	53 HONKYTONK PIANO	54 ELEC. PIANO
55 HARPSICHORD 1	56 HARPSICHORD 2	57 SYNTH. LAB	58 METAL HONKYTONK	59 DOUBLE ATTACK
60 BELLS	61 CARILLON	62 SYNTH. CELESTA	63 SYNTH. VIB.1	64 SYNTH. VIB.2
65 SYNTH. VIB.3*	66 BELL-STAR	67 XYLOPHONE	68 SOFT XYLOPHONE	69 MARIMBA
70 ACO. GUITAR 1	71 ACO. GUITAR 2	72 SEMIACE GUITAR	73 FEEDBACK	74 ELEC. GUITAR 1
75 ELEC. GUITAR 2	76 FELL BASS	77 ELEC. BASS	78 SLAP BASS	79 METALLIC BASS
80 SYNTH. DRUMS 1*	81 SYNTH. DRUMS 2*	82 SYNTH. DRUMS 3*	83 SYNTH. CLAPPER*	84 TAMBOURINE*
85 COWBELL	86 CONGA	87 TABLA*	88 AFRO PERCUSSION*	89 STEEL DRUM
90 MOTORCYCLE*	91 JET PLANE*	92 EXPLOSION*	93 CHICKEN SOUND*	94 DANGEROUS SOUND
95 SCRATCH SOUND*	96 [illegible] SOUND	97 LASER GUN	98 [illegible]*	99 WHIP*

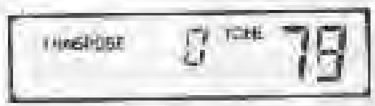
*8-note polyphonic. All others are 4-note polyphonic.
▲indicates no fixed pitch.

<Example>

To call up No.78 SLAP BASS, first press the 7 key. At this time the display should appear as illustrated below, and the present tone should not yet change.
*Mistakes can be cleared and the previous timbre can be reinstated by pressing the cancel key.



Now pressing the 8 key causes the value 78 to appear on the display and the timbre will be that which corresponds to the specified value (SLAP BASS).



(2) INTERNAL VOICES

Of the 100 preset voices, Nos.96 – 99 can be rewritten with external MIDIdata*. However the initialization routine (see page 9) restoresthe timbres noted on the list to these voices.

*Timbre data can be stored to specified numbers by transmitting system exclusive messages from a personal computer to the keyboard MIDI terminal (see page 43).

■ PRESET RHYTHMS

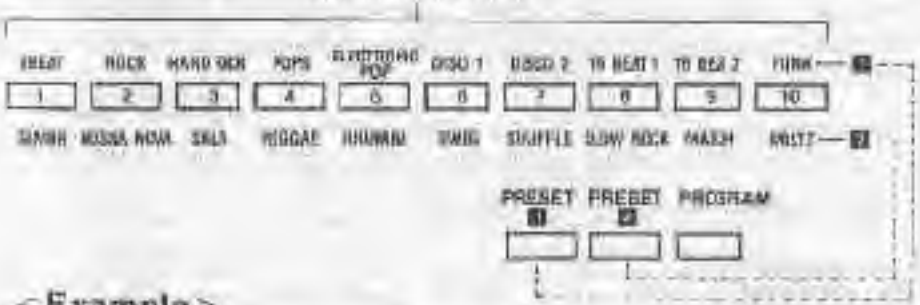
The CZ-230S is equipped with 20 preset rhythms produced by PCM sound source. Each rhythm pattern is also capable of producing an intro pattern and fill-in pattern.

(1) PRESET RHYTHM

①Set the RHYTHM MODE selector to PATTERN PLAY.

②Press the rhythm selector that corresponds to the desired rhythm.

•Press PRESET 1 to select the rhythms marked above the selectors and PRESET 2 for the rhythms marked below the selectors.



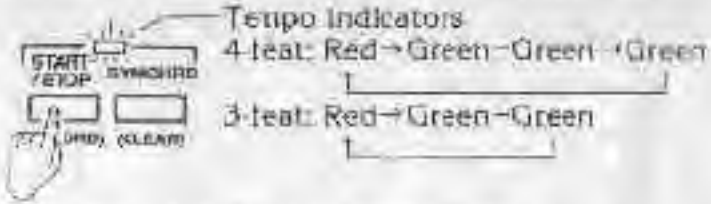
<Example>

To select the SWING rhythm, press PRESET 2 followed by selector 6.

③Pressing the START/STOP key begins play of the selected rhythm.

•While a rhythm is playing, the rhythm indicator flashes red for the first beat of each measure and green for each subsequent beat.

•Pressing the START/STOP key again stops rhythm play.



④Adjust volume using the PCM volume control.

⑤Adjust the rhythm tempo (speed) using the TEMPO ∨∧ keys.

•Each press of ∨ decreases tempo while ∧ increases tempo.

•The current tempo value appears on the display any time a TEMPO key is pressed. Holding down either TEMPO key causes high-speed continuous change of the value. The TEMPO display is cleared when the TEMPO keys are released.

Tempo display (00 – 44)

• The tempovalue is displayed in 45 steps within the range of 00 ~ 44. The following table provides the meaning of each value.

<Example>

A tempo value of 26 means ♩ = 120 (120 beats/minute).

Display	Data ♩ = beat/min.	Display	Data ♩ = beat/min.	Display	Data ♩ = beat/min.
00	40	15	76	30	144
01	42	16	80	31	152
02	44	17	84	32	160
03	46	18	88	33	168
04	48	19	92	34	176
05	50	20	96	35	184
06	52	21	100	36	192
07	54	22	104	37	200
08	56	23	108	38	208
09	58	24	112	39	216
10	60	25	116	40	224
11	63	26	120	41	232
12	66	27	126	42	240
13	69	28	132	43	248
14	72	29	138	44	256

• The selected tempo value is retained even when the power of the unit is switched OFF.

(2) SYNCHRO START

Pressing the SYNCHRO START key while rhythm is not playing causes the tempo indicator to flash green to indicate SYNCHRO START STAND BY. In this mode the rhythm accompaniment will begin as soon as a key on the LOWER KEYBOARD is pressed.

• Pressing the SYNCHRO START key during SYNCHRO START STAND BY cancels the stand by mode.

<SYNCHROSTART STAND BY> <SYNCHRO START>

(3) INTRO/FILL-IN

Pressing the INTRO/FILL-IN key while rhythm is not playing sounds a 1-measure introduction pattern and then starts normal rhythm play. Pressing while rhythm is playing causes a fill-in pattern to play that continues to the end of the current measure.

• Holding down the INTRO/FILL-IN key causes the fill-in pattern to continue until the end of the measure in which the key is released.

• Normal play always resumes from the first beat of the first measure of the normal pattern when the fill-in is complete.

NOTE

The rhythm START/STOP key is inoperative whenever the MIDI ON/OFF switch on the rear panel is set to ON and the CLOCK switch is set to EXT.

■ RHYTHM PROGRAMMING

The CZ-230S s equipped witha rhythm programming function that provdes 12 PCM rhythm sources to produce bass drum, snare drum, and other effects. Up to four of the 100 preset voices can be used to program a 4-line multi-track pattern. This means that the CZ-230S is equivalent to a 4-track sequencer with drum machine.

(1) FEATURES AND FUNCTIONS

Programming consists of creating a number of rhythm patterns and then joining them together nto a single song. The capacity of the unit allows storage of up to 30 rhythm patterns and a 199-bar song program.

①30 patterns

Three measures of a rhythm pattern can be stored to each of the 10 rhythm selectors (1 - 10).

②16 soundsources

12 PCM rhythm sound sources and 4 PD sound sources timbres add up to a total of 16 soundsources available for pattern programming.

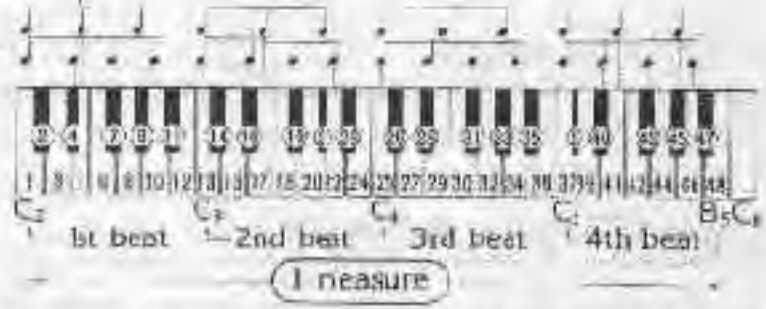
③1/12-beat minimum note value

The minimum programmable note value is 1/12-beat, which is one third ofa 16th note (♪), however, the maximum number of notes input for a single sound source per measure is only 16.

④Keyboard input for programming

The 48 keys on the keyboard from C_3 through B_5 are used to indicate the timing of each note as indicated below.

(Triplicate 8th notes)
(16th notes)



*The white key on the extremeright of the keyboard (C_6) acts as an accent key.

⑤Accenting

Pressing the ACCENT key simultaneously withtiming input on the keyboard applies an accent to the note played.

⑥8-note polyphonic

Up to 4 PCM nythm tones and 4 PD sound source timbres can be produced simultaneously.

*PCM rhythmsound sources are divided into 4 goups of 3 effects each. No two effects from the same group can be produced sinultaneously. Only one effect canbe produced from the sane group at any one time.

GROUP A: BD (bass drum), LT (low tom), LB (low bongo)
GROUP B: SD (snare drum), HT (high tom), HB (high bongo)
GROUP C: CH (closed hi hat), OH (open hi hat) RIDE (ride cynbal)
GROUP D: RIM (rim shot), CB (cow bell), CLAPS (hand claps)

*Only monophonic tones can be input to each of the 4 lines of the PD sound source.

⑦Two types of beats
Patterns can be programmed in either 4/4 time or 3/4 time.

⑧199 song steps
Songs up to 99 steps long can be programmed and stored (1 step = 1 measure).

(2) PATTERN MEMORY

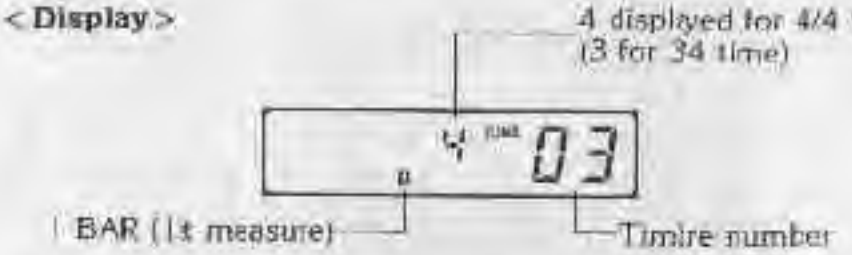
MODE SETTING

①Press the PROGRAM key.
•Rhythm programming cannot be performed if PRESET 1 or PRESET 2 are selected.

②Set the RHYTHM MODE selector to PATTERN MEMORY.
•This enters what is defined as PATTERN MEMORY STAND BY.

•At this time also select either 4/4 or 3/4 for the rhythm to be programmed.

<Display>



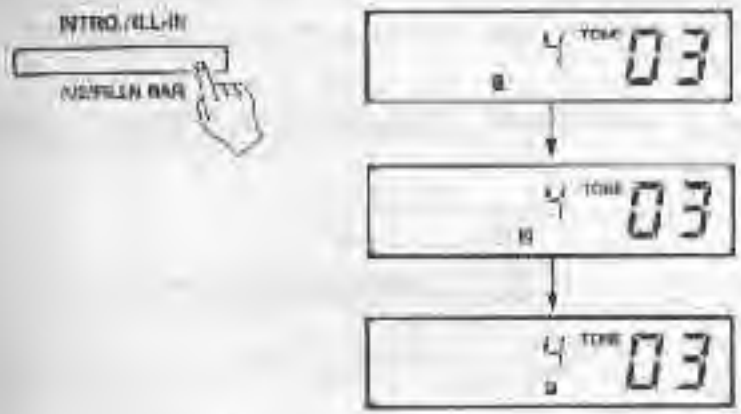
•If either PRESET 1 or PRESET 2 is selected, the display will flash at this point to indicate that input cannot be performed. In this case, press the PROGRAM key to clear the flashing display and to enter PATTERN MEMORY STAND BY.

PROGRAM AND MEASURE NUMBER SELECTION

③Use the rhythm selectors to choose a program number.
•Up to three measures can be programmed for each program numbers (1 – 10).

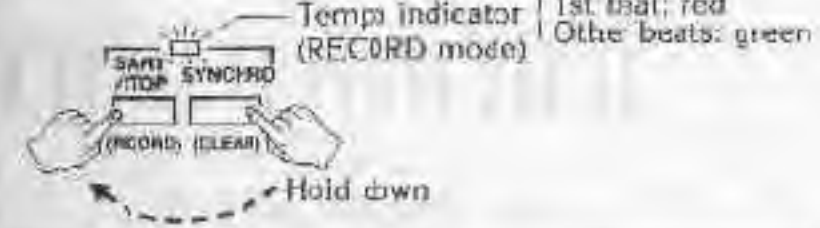
④Use the INTRO/FILL-IN key to select the measure number.
•The initial value for this selection is the first measure (1 BAR). Each press of the INTRO/FILL-IN key changes the selected measure in the following order and shows it on the display:
1 BAR→ 2 BAR→ 3 BAR → 1 BAR→ ...

•Select either 1 BAR, 2 BARor 4 BAR.



CLEARING A SINGLE MEASURE

⑥Press the START/STOP (RECORD) key while holding down the SYNCHRO (CLEAR) key to clear the existing contents of the measure selected in step ④. This process also enters the RECORD mode to allow new input for the selected measure.



NOTE INPUT

⑥Pressing thekeyboard while n the RECORD mode inputs a note according to the specified timing in the timbre corresponding to the timbre selected.

•The single measure clear operation outlined in 5 automatically enters he RECORD mode. While the tenpo indicator is OFF and he unit is in PATTERN MEMORY STAND BY, the keyboard will produce theselected timbre, but notes cannot be input. Press the START/STOP (RECORD) key to enter the RECORD mode to allow note input.

•Pressing theSTART/STOP (RECORD) key before performing the single measure clear operation results in repeat playback of any data dready in memory. In this mode, iming can be set using the keyboard and new notes can be added to the previous contents.

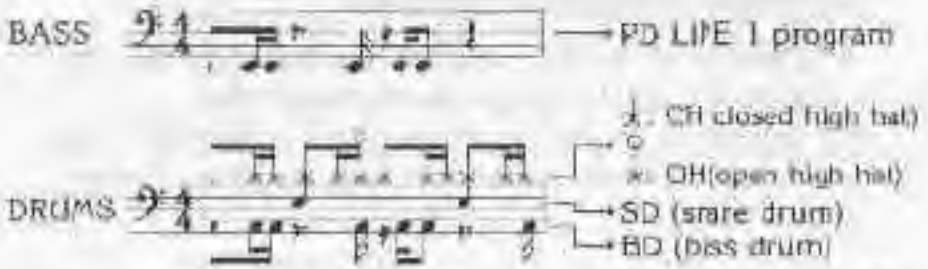
⑦Press the START/STOP (RECORD) key again to exit the RECORD mode and complete note input.

NOTE INPUT OPERATIONAL PROCEDURE

The following presents an actual sample procedure using simple musical notation. The PD sound source programming almost identical to that of the PCM rhythm sound source, except for the addition of pitch input. This example will use 4 PCM rhythm sound sources for the rhythm pattern plus line 1 of the PD sound souce to add a bass phrase to form a 1-measure pattern.

BEAT = 4/4: Set the RHYTHM MODE selector to "PATTERN MEMORY 4/4".

<NOTATION>



①Set the RHYTHM SOUND SOURCE selector to BD (bass drum).

②Press the START/STOP (RECORD) key to select the RECORD mode.

③Use the keyboard keys to input the BD notes as illustrated below. The ● and ○ symbols indicate the keys to be pressed, and the order or the timing in which the keys are pressed is irrelevant.

•The pattern input for one measure plays repeatedly when input is complete. No sound is produced when a key is actually pressed for input.

•One of the two following procedures can be used to correct erroneous input.

Correcting erroneous input

ⓐ Press the SYNCHRO (CLEAR) key to clear all BD line notes and start input from the beginning.

ⓑ Press a key on the keyboard at the point where the error exists to erase the error only and input the correct note.

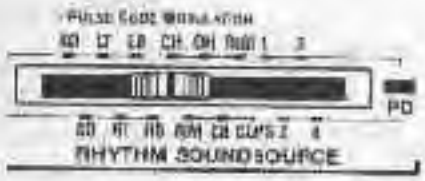
•To apply an accent to a note, press the appropriate keyboard key in the proper timing while holding down the ACCENT key on the extreme right of the keyboard (see page 16).

④Set the RHYTHM SOUND SOURCE selector to SD (snare drum).

•The setting of the RHYTHM SOUND SOURCE selector can be changed during recording operations.

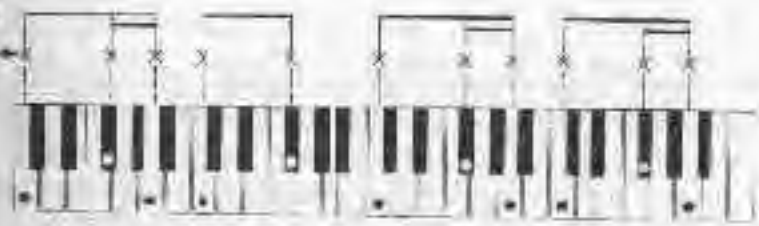
⑤Use the keyboard keys to input the SD notes as illustrated below. The BD and SD patterns will be played back, superimposed within the same measure.

⑥Set the RHYTHM SOUND SOURCE selector to CH (closed high hat).



⑦Use the keyboard keys to input the CH notes as illustrated below. The 3D, SD, and CH patterns will be played back, superimposed within the same measure.

CH notes



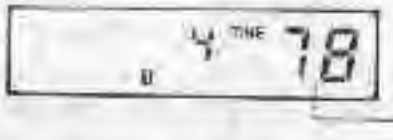
⑧Set the RHYTHM SOUND SOURCE selector to OH (open hi hat).

⑨Use the keyboard keys to input the OH notesas illustrated below. The 3D, SD, CH, and OH patterns will bi played back, superimposed within the same measure.

OH notes

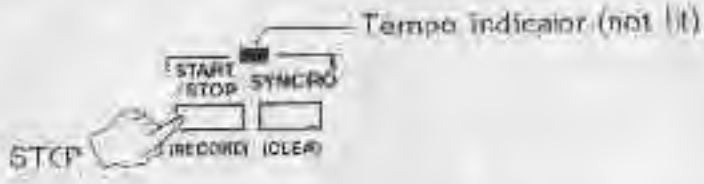
⑩Set the RHYTHM SOUND SOURCE selector o PD-1.

⑪Use the ten-tey pad to select No.78 (SLAP BASS). The number of the currently selected timbre is shown oi the display.



•Timbre numier selection car be performed either during recording or while rhythm is not being played One timbre can be speciied per line.

⑫ Press the START/STOP (RECORD) key to suspend the RECORD node.



⑬ Press E_3 or the keyboard which is the value of the first bass note. If the wrong key is pressed, simply press the correct key to charge the note. The note corresponding to the last key pressed is stored in memory.

⑭ Press the START/STOP (RECORD) key to reenter the RECORD node, and any part of the pattern input up to this point will begin to play back.

⑮ Use the keyboard keys to input the bass notes as illustrated below. In his particular example, all the bass notes are the same and can all be input at this step.

• The sound source selector PD indicator lights a soon as notes are input.

Bass notes (PD-1 line)

• During PD sound source note input, rests can also be inserted between notes. In the input procedure outlined above, rests were not included, so notes end up being linked with each other ♩ ♫ ♪ ♪. ♩ ♫ 𝅗𝅥. Use the keyboard keys to input the rests while holding down the [C] (CANCEL) key.

⑯ Press the START/STOP (RECORD) key to exit the RECORD mode and stop playback.

PATTERN MEMORY APPLICATIONS

① CHANGING PITCH

Inputting different pitches on the same PD sound source line is accomplished by performing steps 12 through 15 in the example each time a new pitch is input. With each change of pitch, the RECORD mode is stopped, a new pitch is specified on the keyboard, the RECORD mode is resumed, and the value of the note is specified.

② CHANGING LINES

Once input to line 1 of the PD sound source (PD-1), the RHYTHM SOUND SOURCE selector setting can be changed to PD-2 for input using a different timbre. The procedure is identical to steps 10 through 15 in the example. Input can also be performed for lines 3 and 4 to result in 4-track multi-channel recording.

- The input line (RHYTHM SOUND SOURCE selector) setting can be changed while still in the RECORD mode.
- The line selection sequence for input really does not matter, but it is suggested that lines be used in the order of 1, 2, 3, 4 to avoid later confusion.

③ CHANGING TIMBRES

The currently selected timbre can be changed as many times as desired, even during the RECORD mode. The new timbre is in effect as soon as a 2-digit value is entered using the ten-key pad. The notes already input are played in the new timbre when the new value is input.

- Only one timbre can be specified per line. A different timbre cannot be specified within a measure for the same line.
- The currently selected timbre cannot be changed when the RHYTHM SOUND SOURCE selector is set to any of the PCM rhythm settings.

④ CHANGING MEASURES

Each press of the INTRO/FILL-IN key changes the selected measure during recording or while rhythm is not being played in the following order and shows it on the display:

1 BAR → 2 BAR → F BAR → 1 BAR → ....

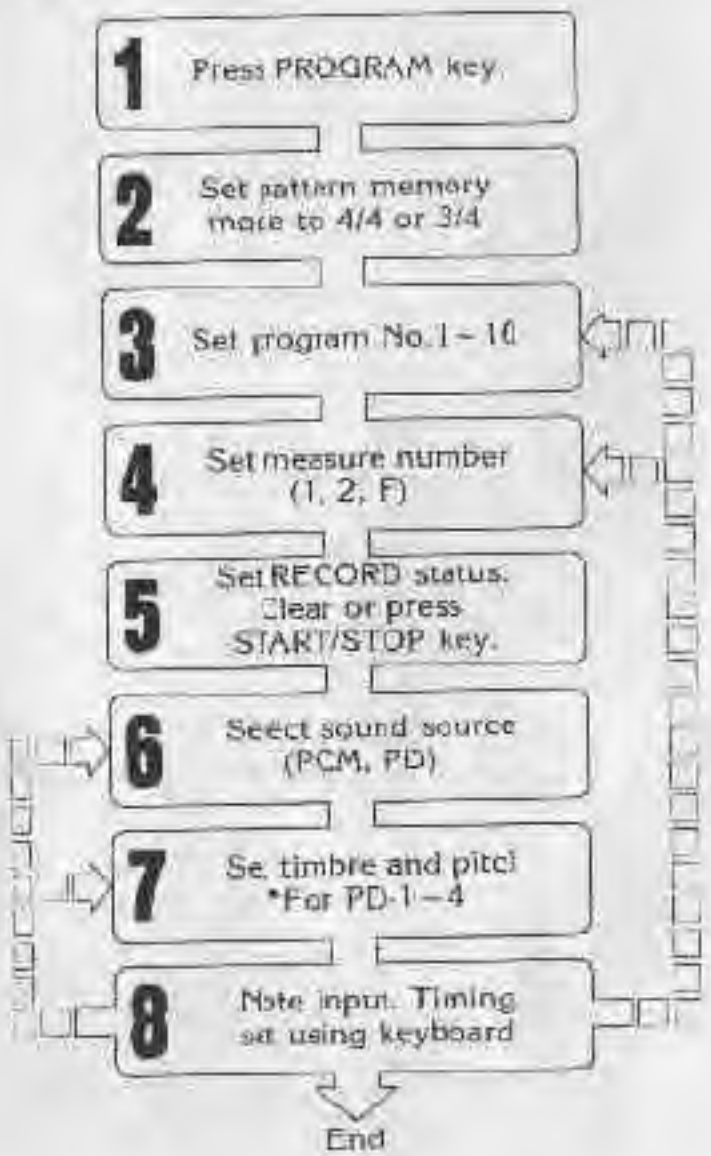
Any notes currently stored in a measure are played back when the measure is selected in the RECORD mode.

- Notes can be input to an existing pattern as it is playing back, or the entire measure can be cleared (see page 18 ⑤).
- Repeating the operation noted above makes it possible to record three measures (1 BAR, 2 BAR, F BAR) for each program number (rhythm selector).

⑤ CHANGING PROGRAM NUMBERS

The program number can be changed by pressing a rhythm selector during the RECORD or RECORD STAND BY mode. Doing this in the RECORD mode changes to the new program number but retains the original measure number specification. At this time any notes previously existing under the selected program are played back.

<SUMMARY>

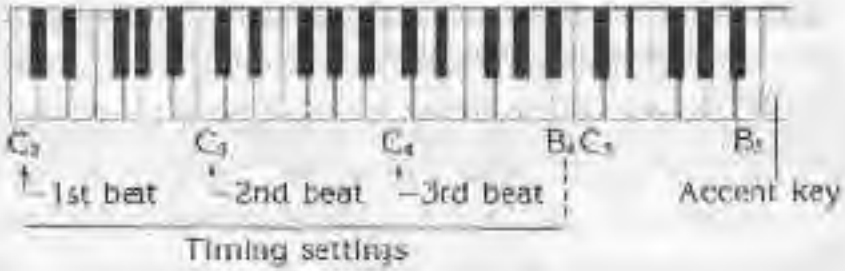


NOTE

- A maximum of 16 notes can be input for each PCM rhythm in each measure. This is also true of each line of the PD sound source. Therefore, if all the notes are of the same value, the lowest value is the 16th note (♪).

- In the example shown above, no more notes can be added for the OH (open high hat) line.
- The following display appears when an attempt is made to exceed the maximum of 16 notes. This display remains while the key for the 17th note is pressed and disappears when the key is released. Of course, the 17th note is not stored in memory.

- A pattern can be entered in 3/4 time when the RHYTHM MODE selector is set to PATTERN MEMORY 3/4. At this time, the note value input keyboard becomes the range from C_2 through B_4, with C_5 through B_5 having no function at all.



- Playing back a pattern recorded in 4/4 time while PATTERN MEMORY 3/4 is set results in the 4th beat of each measure being cut off. Conversely playing back a pattern recorded in 3/4 time while PATTERN MEMORY 4/4 is set results in a rest being inserted for the 4th beat of each measure.
- Either 4/4 time or 3/4 time patterns can be programmed for any measure, and different times can even be programmed for two measures under the same program number.

- Changing the setting of the RHYTHM MODE selector causes playback operations to stop. Pressing the PRESET 1 or PRESET 2 key duringrecord operations cancels the RECORD mode.

- An accented note (see page 16) already existing in memory can be changed to an unaccented note by pressing the corresponding timing key (on the keyboard) twice.

•Any one of the three following methods can be used to delete notes from each sound source or line in a pattern.

①Press the keyboard keys in the RECORD mode that correspond to the timing of the note to be deleted.

②Press the SYNCHRO (CLEAR) key in the RECORD mode to delete all notes for the currently selected sound source or line.

③Hold down the SYNCHRO (CLEAR) key while the RHYTHM MODE selector is set to PATTERN MEMORY and press the START/STOP (RECORD) key to delete all sound source and line data from the currently selected measure.

•12 PCM rhythms and 4 PD sound sources can be used in pattern programming, but certain PCM rhythms cannot be produced simultaneously (see page 6). If two rhythms from the same group are specified, that which is specified last takes priority.

•For PD sound source timbres, recorded pitches can be replaced by pressing the appropriate keyboard (timing) key twice. The first press deletes the existing note, while the second press inputs the new note.

•The number of rests that can be included in a single measure depends upon the number of notes input. Since a measure can hold a maximum of 16 notes, a measure which already contains 10 notes can have 6 rests. The timing of rests is limited to the following locations:

①Between notes (rests cannot be included in measures that include no input)

②Between the beginning of a measure and a note

③Between a note and the end of a measure

④Between the beginning and the end of a measure for a specific line

One rest can be included at each of the locations noted above. Condition 3, for example, can be used in pattern or song playback to prevent the last note of one measure from continuing into the next measure during playback.

•Rest data is deleted whenever note data immediately preceding the rest is deleted. Inputting a note where a rest has already been specified replaces the rest with the input note.

•PATTERN PLAY repeatedly plays back the rhythm patterns in the order ① BAR → ② BAR, and plays the E BAR when the INTRO/FILL-IN key is pressed. Up to 30 measures of patterns can be joined together for song play. The keyboard is 4-note polyphonic when no notes at all are input in the 4 lines of the PD sound source. If even one line of PD line 1 – 3 contains note data, however, the keyboard becomes monophonic. Note data input to the PD-4 line makes the keyboard inoperative during pattern playback. Only input pattern data to PD lines 1 – 3 if you wish to play along on the keyboard with the pattern playback.

• The same timbre can be set for three of the PD sound source lines. n this case, thetimbre should be set to lines 1 through 3. If the fourth ine is used for the seme timbre, the fdlowing points slould be noted when the pattern is programmed.

* A rest must always be included in the measure (pattern) immediately preceding ue of the fourth lire when the fourth lire is not used urtil some point vithin a song.
* Always inputa rest in measues immediately preceding use of lire 4 that contair no notes for lire 4.

• A slight breal always occurs vhen changing between two differenttimbres in the ame line.

(Fig. 1)

JAZZ ORGAN–JAZZ ORGAN

(Fig. 2)

JAZZ ORGAN–FLUTE

(3) PATTERN PLAY

MODE SETTING

①Press the PROGRAM key.

• Program pattern playback cannot be performed if PRESET 1 or PRESET 2 are selected.

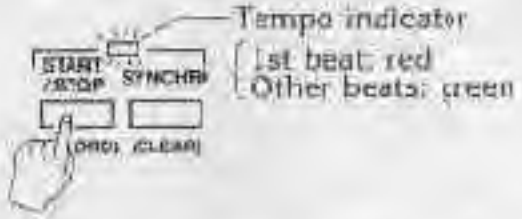
②Set the RHYTHM MODE selector to PLAY.

PROGRAM NUMBER SELECTION AND PLAYBACK

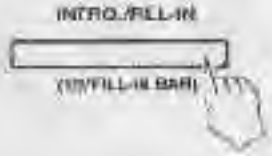
③Press the rhythm selector that corresponds to the program to be played back.

• Each selector can hold up to 3 measures of patterns (1 ~ 10).

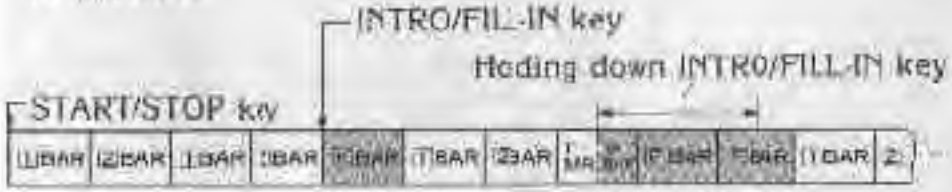
④ Press the START/STOP key to begin repeat playback of the rhythm pattern (1 BAR→ 2 BAR).



⑤ Pressing the INTRO/FILL-IN key switches to the F BAR pattern. After the fill-in pattern, playback returns to 1 BAR→2 BAR.



•Holding down the INTRO/FILL-IN key caused the fill-in pattern to continue until the end of the measure in which the key is released.



•Pressing a rhythm selector switches to the newly specified program number but maintains the present measure number setting.

⑥ Pressing the START/STOP key again terminates playback at that point.

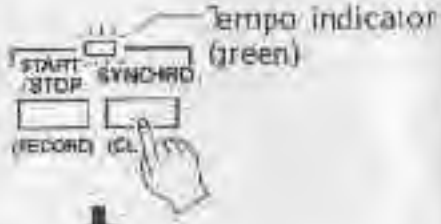
SYNCHRO START AND INTRO PATTERN

<SYNCHRO START>

Pressing the SYNCHRO START key while rhythm is not playing causes the tempo indicator to flash green to indicate SYNCHRO START STAND BY. In this mode the rhythm accompaniment will begin as soon as a key in the LOWER KEYBOARD is pressed.

•Pressing theSYNCHRO START key during SYNCHRO START STAND BY cancels the stand by mode.

SYNCHRO START STAND BY



SYNCHRO START

<INTRO PATTERN>

Pressing the INTRO/FILL-IN key while rhythm is not playing sounds a 1-measure introduction pattern and then starts normal rhythm play using the specified program number.

•The intro pattern for pattern play is different from that for preset rhythms. The first beat is always CH (closed high hat) no matter what the program number.

NOTE

•The display appears as illustrated during payback.

•The timbreavailable for 4-note polyphonic pay is displayed when notes are not present in the PDiine. The timbre dislayed can be used for monophonic play when note: are present in 1or more lines (1 through 3 only). The ten-key pad can be used to change the timbre nunber during playback.

Number of timbre assigned to keyboard

•"__" is displayed during playback of a pattern for which note data is include(in PD-4 to indicate that the keyboard is inoperative.

No keyboard play

(4) SONG MEMORY

SONG MEMORY MODE SETTING

①Press the PROGRAM key (when using preprogiammed patterns to creae a song)

•Press PERSET 1 or PRESET 2 when usingpreset rhythm patterns to create a song.
•The PRESET 1 , PRESET 2 and PROGRAM keys can also be used during recording.

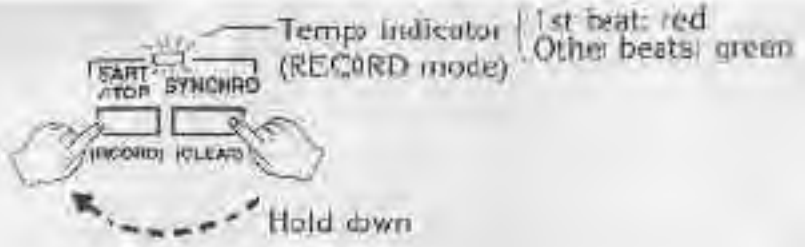
②Set the RHYTHM MODE selector to SONG MEMORY.

•The displayshould now apprar as illustrated:o indicate the number of steps. The initial value is always)0.

Step number (00 – 199)

SONG ALL CLEAR

③Press the START/STOP (RECORD) key while holding down the SYNCHRO (CLEAR) key This operation dears all previous contents of the song memory and automatically enters the RECORD mode for programming of a rew song. Also at this time the selected program number (or preset rhythm) begins repiat play from 1 BAR.



•The display should show STEP 1 to indicate the first step.

PATTERN SELECTION

④ Rhythm selectors are used to select a program number (or preset rhythm), while the INTRO/FILL-IN key is used to select the measure.

•The selected pattern measure number is shown on the display, and the selected pattern is repeatedly played back.

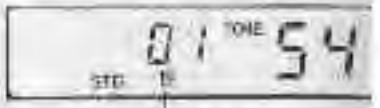
•The specified measure number is not changed even if a different program number (or preset rhythm) is selected.

<Example>

ⓐ Program No.5, 1 BAR selected

ⓑ Switch to Program No.2 Playback switches to Program No.2, 1 BAR and the display does not change.

ⓒ Change the measure to 2 BAR. Playback switches to Program No.2, 2 BAR, and display change as illustrated.



SONG STEP INPUT

⑤ Pressing the START/STOP (RECORD) key while in the song RECORD mode inputs the currently selected pattern as one step. At this time, the unit automatically advances to the next step for recording and the display shows the next step number.

•Repeating steps ④ and ⑤ above makes it possible to link a series of rhythm measures into a song.

<Example> Create a song as illustrated below:

★

Step number	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5
Program number—measure number	2 – 2	6 – 2	5 – 2	1 – F	10 – 1

① Press RHYTHM SELECTOR [2] and select [2] BAR using the INTRO/FILL-IN key.

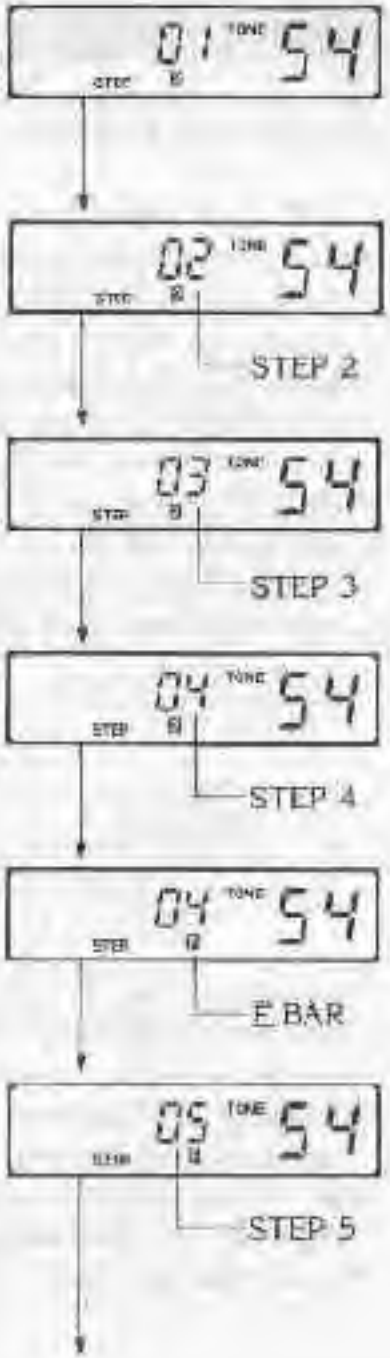
Then press the START/STOP key to input STEP 1.

② Press RHYTHM SELECTOR [6]. Then press the START/STOP key to input STEP 2

③ Press the START/STOP key again to input pattern 6-2 into STEP 3 also.

④ Press RHYTHM SELECTOR [E] and use the INTRO/FILL-IN key to select [F] BAR.

Then press the START/STOP key to input STEP 4.



⑤ Press RHYTHM SELECTOR [10] and then press the INTRO/FILL-IN key to select [1] BAR.

Finally, press the START/STOP key to input STEP 5.

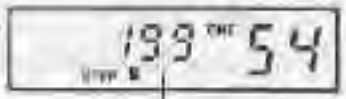
ENDING SONG INPUT

Once recording is started in the SONG MEMORY mode, it is stopped using the RHYTHM MODE selector to cancel the SONG MEMORY mode.

- Moving the RHYTHM MODE selector to SONG PLAY allows playback of a programmed song.

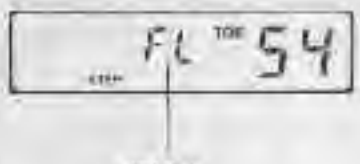
NOTE

- A maximum of 199 steps (measures) can be programmed into one song. Exceeding this results in the indicator "FL" (full) appearing on the display and further input will be impossible.
- The stepcount display does not advance to 200 when STEP 199 is input.



STEP 199 displayed even if more input attempted.

*Attempting to input the 200th stepby pressing the START/STOP key results in the indicator "FL" (full) appearing on he display. The step count shows 199 when the STAR"/STOP key is released.



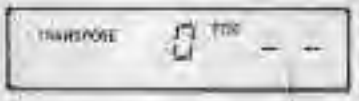
FULL

*The "FL" (full) display also appears when an attempt is made to nsert a step into a song that already contains the maximum allowalle 199 steps.

*The timbrenumber is displyed during song step input as follows:

*The timbre available for 4-note polyphonic play is displayed when notes are not present in the PD line. The timbre displayed can be used for monophonic play when notesare present in 1or more lines (1 through 3 only). The ten-key pad can be used to change the timbre number during playback.

*The display shows "--" for patterns in which notes are present in PD-4.



No keyboard play

*Selecting a pattern in which notes are present in the PD sound source line during song step input causes the PD sound source indicator to light.

SONG EDITING

<LOCATING STEPS>

Specific portions of stored data can be corrected and modified either during song step input or anytime after input is complete. Enter the RECORD mode and use the VALUE ∨∧ keys to locate thestep to be edited.

*The VALUE ∨∧ keys can also be used to locate steps while in the RECORD mode. If the SONG MEMORY mode has already been exited, set the RHYTHM MODE seector to SONG MEMORY and press the START/STOP (RECORD) key.

*Each press of ∨ moves to the previous step, while ∧ moves to the next step. Holding down either key causes high speed continuous change of the step.

*Operation of the VALUE ∨∧ keys allows recall of the pattern stored in any step. The currently selectedstep (measure) number is shown on the display.

*The range of movement within a completed song is from the first step up to the step following the last step input. If the step following the last step input is recalled, playback is performed for the selected measure of the program number specified on the keyboard console.

<DELETE>

Once a step (measure) is locatel using the VALUE ∨∧ keys in the RECORDmode, the SYNCIRO (CLEAR) ker can be used to delete the sep.

- When a step i deleted, all steps following are automatically shifted forwad to fill the now empty step, and the new data for the step i played back.
- Deleting the list step of a songmakes that step the new limit for the rangeof movement within a completed song (range of movement = first step up o step following last step input). At this tme, playback begins for the selected measure of the program number specified on the keyboard console.

<INSERT>

Once a step (measure) is located using the VALUE ∨∧ keys in the RECORD mode, the SOLO (INSERT) key can be used to insert a new pattern at the selected step.

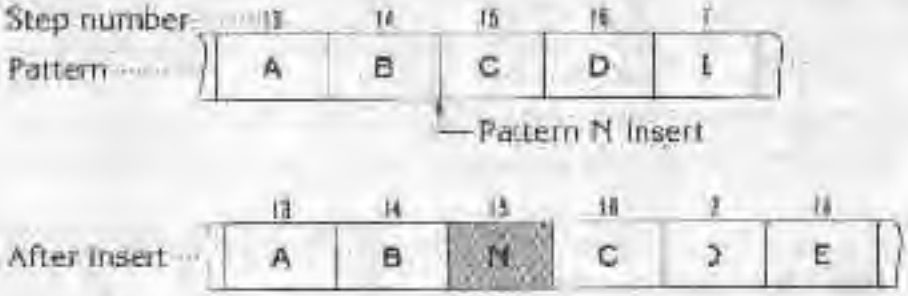
①Press the SOLO (INSERT) ke) and the indicator will light to signal INSERT STAND BY. Pressing the SOLO (INSERT) key at this time cancels INSERT STAND BY and causes the indicator to go OFF.

②After selecing the desired pattern progran number and measure while in INSERT STAND B', press the START/STOP (RECORD) key to input the sdected pattern at the present step (measure).

- All steps (measures) following the location of the insert are shifted to alow for the new measure.

<Example>

Insert a new pattern between STEP 14 and STEP 15 of a song.



- Pressing the VALUE ∨∧ keys cancel INSERT STAND BY.

<STEP DATA MODIFICATION>

Once a step (measure) is locaed using the VALUE ∨∧ keys in the RECORD mode, the pattern recorded can be replaced with a different pattern.

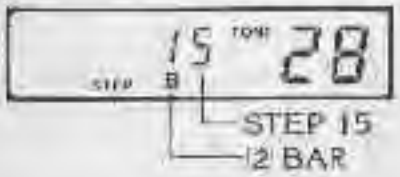
- The measure selected using the VALUE ∨∧ keys is played back when elected. At this time, setting a new pattern program number and measure number plays back the new pattern. Now pressing the START/STOP key replaces the originally recorded pattern with the newly seected pattern.
- Only the seected step is modified with no efect upon any of the other steps in the song.

<Example>

Replace the pattern at STEP 5 (No.5/ 2 BAR with a new pattern (No.8/ F BAR).

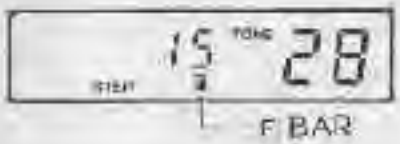
①Enter the RECORD mode and use the VALUE VA key to move to STEP 15.

- At this time Program No.1/2 BAR should begin to playback.

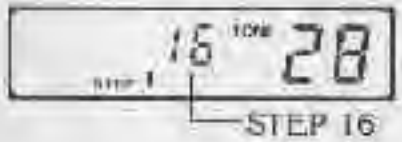


②Press the PROGRAM key and RHYTHM SELECTOR 8 ,and use the INTRO/FILL-IN key to select the F BAR pattern.

- At this time Program No.1/ F BAR should begin to playback.



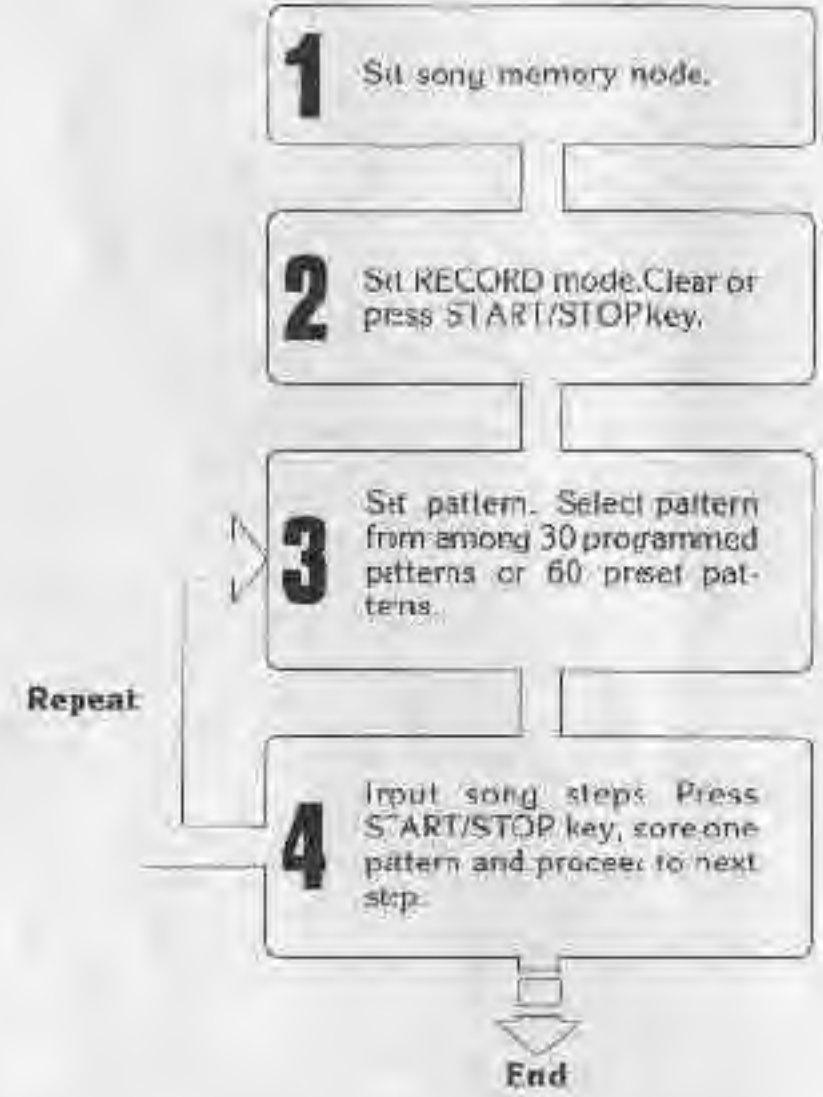
③Press the START/STOP (RECORD)key to write the new data (No.8/ F BAR) at STEP15. The unit will automaticallyadvance to the next step (16) which willbe indicated onthe display.



NOTE

The following points should be noted carefuly when performing the procedure outlined above:
Pressing the START/STOP (RECORD) key without first selecting a new input pattern causes the patern for the currently selected rhythm selector to be input. The new input will not be played back because the unit immediately advances to the next step.

<SUMMARY>



*Editing pocedures (delete/insert/modify) not included here.

(5) SONG PLAY

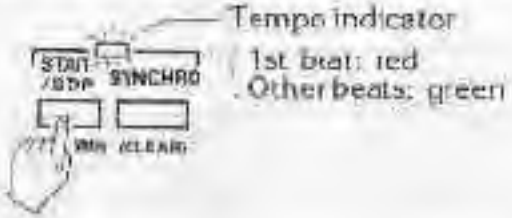
SONG PLAY MODE SETTING

①Set the RHYTHM MODE selector to SONG PLAY.

•The PRESET I II III, PROGRAM key selections have no effect upon this operation.

SONG PLAYBACK

②Pressing theSTART/STOP keys begins playback of the song from STEP 1.



•The display shows the STEP number and pattern measure number during playback. The program number is not displayed.

③The START/STOP key can be used to stop payback at any point. Playback is automatically terminated afer the last step of the song is played.

SYNCHRO START AND CONTINUE PLAY

<SYNCHRO START>

Pressing the SYNCHRO START key while rhythm is not playing causes the tempo indicator to flash green toindicate SYNCHRO START STAND BY. In this mode, songplayback will begin as soonas a key on the LOWER KEYBOARD is pressed.

•Pressing theSYNCHRO START key during SYNCHRO START STAND BY cancels the stand by mode.

SYNCHRO START STAND BY

SYNCHRO START

<CONTINUE PLAY>

Pressing the SYNCHRO key or INTRO/FILL-IN key during song playback suspends playback at that point.
Pressing the START/STOP key again resumes playback from the point at which it was suspended.

- When playback is suspended using the SYNCHRO key, playback can also be resumed by pressing a key on the LOWER KEYBOARD.
- The TEMPO INDICATOR flashes green when playback is suspended by the SYNCHRO key and red when suspended using the INTRO/FILL-IN key.
- Pressing the SYNCHRO key again after playback is suspended by the SYNCHRO key, or pressing the INTRO/FILL-IN key again after playback is suspended by the INTRO/FILL-IN key terminates playback completely. CONTINUE PLAY can no longer be used in these cases.

NOTE

- The display appears as illustrated below during song playback operations.
  - The timbre available for 4-note polyphonic play is displayed when notes are not present in the PD line. The timbre displayed can be used for monophonic play when notes are present in 1 or more lines (1 through 3 only). The ten-key pad can be used to change the timbre number during playback.

Number of timbre assigned to keyboard

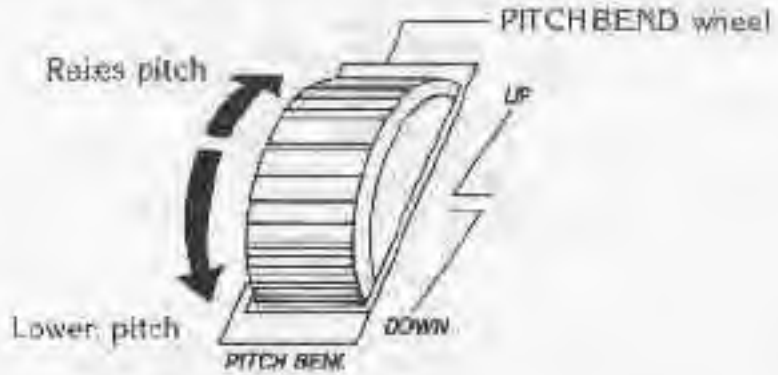
  - The display shows "--" for patterns in which notes are present in PD-4.

No keyboard play

  - The display will show the final step number when a song is allowed to play to the end until it stops automatically. STEP 1 is always displayed whenever the START/STOP key is used to interrupt playback.
- The rhythm selectors are inoperative in the SONG PLAY mode.

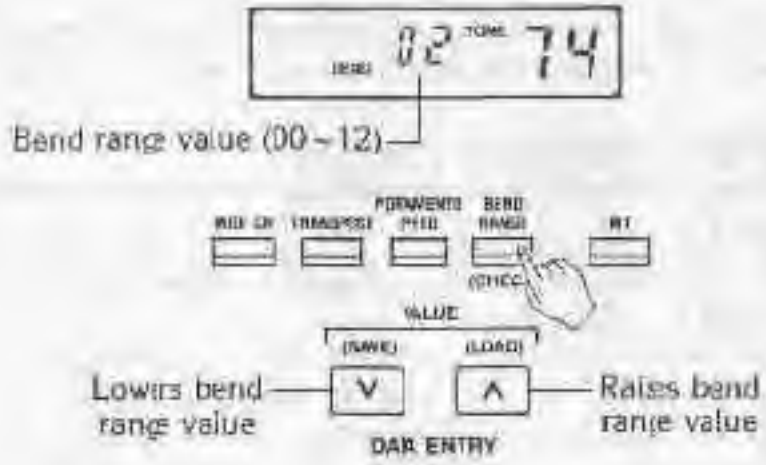
■ PITCH BEND

The pitch of the entire keyboard can be controled by rotating the PITCH BEND wheel. Rotating the wheel in the direction of the front of the keyboard deceases pitch, while rotating it in the direction towards the backof the keyboard increases pitch.



•BEND RANGE

The pitch of the keyboard is changed by the PITCH BEND wheel within a bend range presettable with a numeric value in the range of 0 through 12. The display appears as illustrated below when theBEND RANGE key is pressed, andthe bend range is adjusted using the VALUE ∨ ∧ keys.



- Operation of the PITCH BEND wheel has noeffect when the bend range is set to 00.
- Changing he bend range value by 1 results in a change in the bend range of ±1 halftone.
- The maximum bend range is 12, and this repesents an overall changein pitch of ±1 octave.
- The bend range value is retained even when he power of the unit is swiched OFF.

■ PORTAMENTO

The portamento effect causesnote changes to be performed with the pitch sliding from one note to the next.

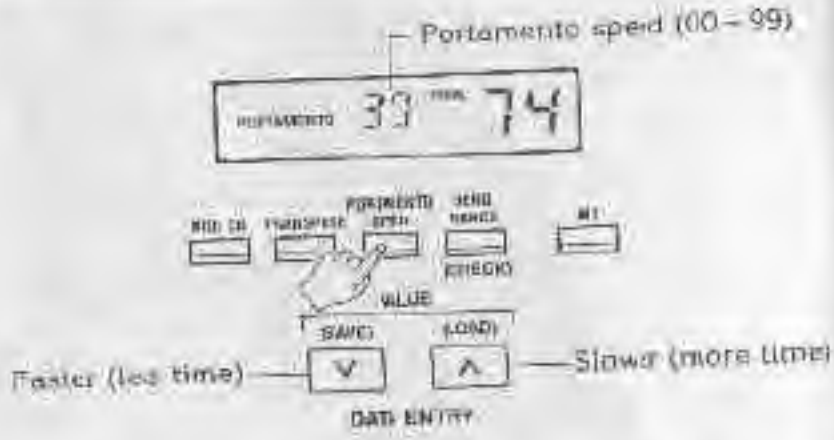
(1) PORTAMENTO ON/OFF

The PORTAMENTO key switches the portamento effect ON and OFF. Potamento is in effect when the indicator above the PORTAMENTO key is ON.

- The manner in which the portamento effect is applied depends upon whether the SOLO key is ON or OFF. When the SOLO key is ON, he portamento efect is only applied to legato play (next keysare pressed whilecurrent keys are still held down). When the SOLO key is OFF all note changes including non-legato, are played applying the portamento effect.

(2) PORTAMENTO SPEED

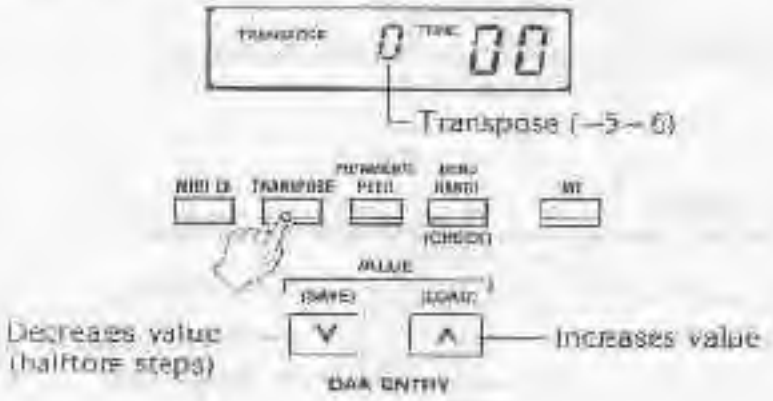
The speedat which the poramento effect sides up or down to the nextnote can be controlled (portamenti speed). The display appears as indicated below when the PORTAMENTO SPEED key is pressed, andthe portamento speed can be adjusted using the VALUE ∨∧ keys.



- Each pres of ∨ increases portamento speed, while ∧ decreases portamento speed. Holding down either key causes high speed continuous change of the portamento speed.
- No portamento effect is applied when the potamento speed is set to 0).
- The portamento is set at itsmaximum when he portamento speed is set to 99 (approximately 17 seconds).
- The portamento speed value is retained ever when the power of the init is switched OFF.

■ TRANSPOSE

The key of the entire keyboard can be adjusted at halftone steps from the standard key of C to any other key in the range of G– F♯. The display appears as illustrated below when the TRANSPOSE key is pressed, and the key of the keyboard can be adjusted to any one of 12 values within the range of –5 (G) – 6 (F♯).



Transpose value	5	4	–3	–2	–1	0	1	2	3	4	5	6
Key	G	A♭	A	B♭	B	C	C♯	D	E♭	E	F	F♯

• The transpose value is retained even when the power of the unit is swiched OFF.

■ SOLO FUNCTION

The keyboard can be changed to monophonic by pressing the SOLO key.

• Each press of the SOLO key switches the indicator above the key ON and OFF. When ON, the keyboard becomes monophonic with the most recently pressed keys given priority.

• The keyboard is polyphonic (8-note maximum) when the SOLO function is OFF.

• The number of notes that can be produced by the keyboard is limited during pattern and song playback, regardless of whether or not the SOLO function is ON. Only monophonic play is available when notes are present in one or more PD lines (PD1 – PD3). The keyboard produces no sound at all during playback of a pattern in which notes are present in the PD-4 line.

■ MT FUNCTION

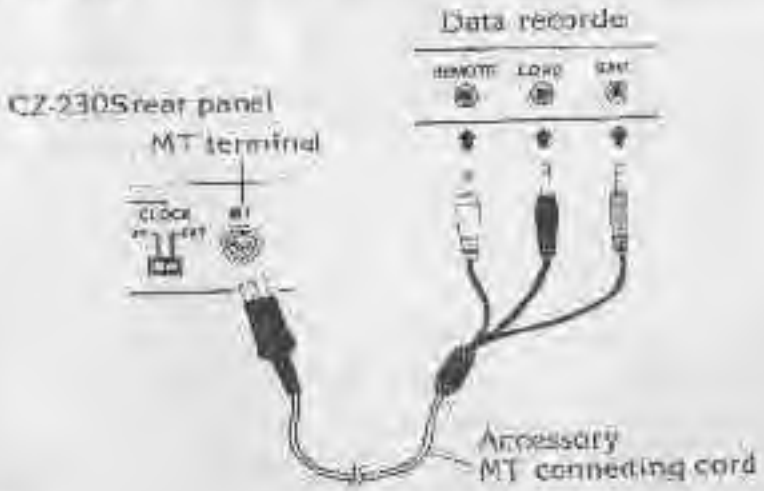
The MT funcion makes it posible to use a cassette tape to store pattern and song data created through rhythm programming.

①SAVE
Transmission of pattern or song data to a cassette tape.

②VERIFY
Confirmation of whether data was stored correctly.

③LOAD
Recall of data from cassette ape to the keyboard.

<CONNECTIONS>
Prepare a data recorder or ordinary cassette tape recorder and one blank tape. Using the accessory MT connecting cord, connect the tape recorder to the keyboard as illustrated below.

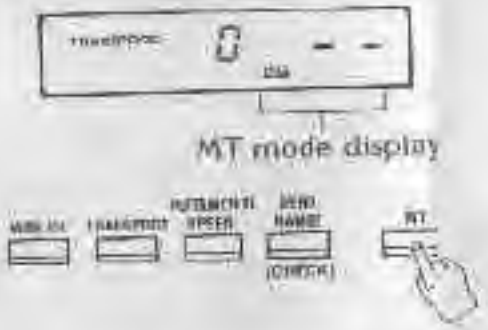


- The connecting cord is split among three plugs for the recorder. Each plug is color coded as follows:

REMOTE (white): Recorder remote (REM) terminal
*Not used when recorder has no remote (REM) terminal.
LOAD (black): Recorder earphone (EAR) terminal or load (LOAD) terminal
SAVE (red): Recorder microphone (MIC) terminal or save (SAVE) terminal

(1) SAVE

①Press the MT key and [MT] will appear on the display as illustrated below.



*No other modes or keys are operational while in the MT mode.

(2) Load a cassette tape into the recorder being used and put the recorder into its RECORD mode.

- The tape will not yet begin to move on recorders equipped with remote terminals.

(3) Press the VALUE V (SAVE) key to begin data save to the cassette.

- The tape will automatically begin to move with this operation on recorders equipped with remote terminals.
- The display will appear as illustrated below during save operations.

"S" displayed during save operations

(4) The display will return to the original MT mode display when save operations are complete.

- The tape will automatically stop on recorders equipped with remote terminals.
- Cancel the RECORD mode of the recorder.

(5) Press the MT key to exit the MT mode.

The following VERIFY operation should be performed whenever data is saved to a cassette tape.

(2) VERIFY

This operation confirms whether or not the data stored on a cassette is identical to that present in the keyboard memory. The verify operation should always be performed to confirm proper storage following the SAVE operation.

(1) Press the MT key. This operation can be skipped if the verify operation is performed immediately following data save.

(2) Rewind the cassette to a point immediately preceding the beginning of the data to be verified.

- If the recorder being used is equipped with a remote terminal, put the recorder into its PLAYBACK (LOAD) mode.

(3) Press the END RANGE (CHECK) key, and the display will appear as illustrated below.

- The tape will automatically begin to move with this operation on recorders equipped with remote terminals.

"C" displayed during verify operations

- For recorders without remote terminals, put the recorder in its PLAYBACK mode to begin verify operations.

(4) The display will return to the original MT mode display when verify operations are complete.

- The tape will automatically stop on recorders equipped with remote terminals.
- Cancel the PLAYBACK (LOAD) mode of the recorder.

⑤Press the MT key to exit theMT mode.

VERIFY ERRORS

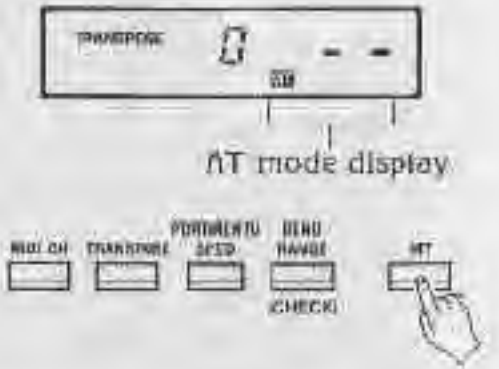
The displaywill appear as illustrated below whenever an error is detected during the verify operation.

Error display

- Whenever an error display appears, press the MT key to terminate verify operations and save the data from the keyboard to the cassete tape again.
- Frequent verify errors may indicate incorrect recorder settingsor a faulty recoder. An insufficent playback levelduring verify ora low record level during save operations are possiblecauses of poor recordings. If problems still exist after correct adjustments are made, try using a different recorder.

(3) LOAD

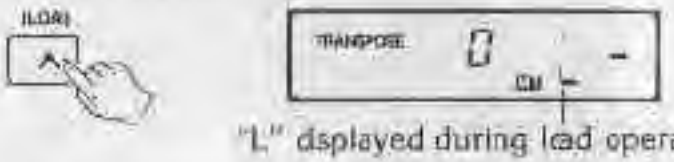
①Press the MT key and MT will appear on the display as illustrated below.



②Rewind the cassette to a point immediately preceding the beginningof the data to be loaded.

- If the recorder being used is equipped with a remote terminal, put therecorder into its PLAYBACK (LOAD) mode.

③Press the VALUE ∧ (LOAD key, and the display will appear as illustrated below.



"L" displayed during load operations

- The tape will automatically begin to move with this operation on recorders equipped with remote terminals.
- For recorders without remote terminals, put the recorder in its PLAYBACK mode to begin load operations.

④ The disply will return to the original MT mode display when load opeations are compete.

- The tape will automaticallystop on recorders equipped with remote terminals.
- Cancel the PLAYBACK (LOAD) mode of the recorder.

⑤ Press theMT key to exit he MT mode.

LOAD ERRORS

The display will appear as illustrated below whenever an error is detected during the load operation.

Error display

- Whenever an error display appears, press the MT key to terminate load operations and load the data from the cassette to the keyboard.
- Frequent load errors may indicate incorrect recorder setting or a faulty recorder. A low playback level can cause errors to be generted. If problemsstill exist after corect adjustmentsare made, try using a different recorder.

(1) MIDI MESSAGE

MIDI (MUSICAL INSTRUMENTDIGITAL INTERFACE) is an international standard interface that allows the connection of two electronic musical instrumens. The CZ-230S is capable of transmitting he following MIDI data.

MESSAGE	SEND	RECEIVE
■ **CHANNEL MESSAGE**		
VOICE MISSAGE		
NOTE OFF EVENT	×	○
NOTE ON EVENT	○	○
CONTROL CHANGE (*1)	○	○
PROGRAMCHANGE	○	○
PITCH WHEEL CHANGE	○	○
MODE MISSAGE		
LOCAL CONTROL OFF	×	○
LOCAL CONTROL ON	×	○
OMNI OFF	× FIXED	× FIXED
OMNI ON	×	×
MONO MODE	×	×
	UNIT SETTING	UNIT SETTING
POLY MODE	×	×
	UNIT SETTING	UNIT SETTING
■ **SYSTEM MESSAGE**		
TIMING CLOCK	○	○
START	○	○
CONTINUE START	○	○
STOP	○	○
SYSTEM EXCLUSIVE (*2)	○	○

(*1)

MESSAGE	SEND	RECEIVE
■ **CONTROL CHANGE**		
CONTINUOUS CONTROLLER		
PORTAMENTO TIME C=5	×	○
SWITCH ON/OFF		
PORTAMENTO ON/OFF	○	○

(*2) SYSTEM EXCLUSIVE MESSAGES

SYSTEMEXCLUSIVE MESSAGE	SEND	RECEIVE
SEND REQUEST (*1)	×	○
RECEIVE REQUEST (*2)	×	○
BEND RAIGE	×	○
KEY TRANSPOSE	×	○

(*1) CZ-230S receives note data when SEND REQUEST message is received.

(*2) CZ-230S receives and stores following 1 timbre data when RECEIVE REQUEST message is received.

(2) POLY MODE/MONO MODE

The CZ-230S is equipped with both a MONO mode and a POLY mode.

•POLY mode
Communications of a single timbre (like 4-note polyphonic synthesizer)

•MONO mode
Monophonic communication of separate timbres on 4 channels

①POLY MODE SETTING

Switch the power of the keyboard ON, and press the MIDI CH key. The display should now appear as illustrated below.

The VALUE ∨∧ keys can now be used to set the channels (01≦MIDI CH≦16), and the ten-key pads are used to set the timbres.

②MONO MODE SETTING

Switch the power of the keyboard ON while holding down the SOLO key to set the MONO mode. Press the MIDI CH key and the display should appear as illustrated below.

Set the timbre for MIDI CH 1 using the ten-key pad. Then press the VALUE ∧ key to advance to MIDI CH 2 and set the timbre. This procedure is repeated until timbres are set for each MIDI channel from 1 through 4.

(3) BASIC CHANNELS

Set the timbres for the sample data listed below.

<Example>

CHANNEL	TIMBRE NUMBER (NAME)
CH 01	03 (SYMPHONIC ENS. 1)
CH 02	31 (FLUTE)
CH 03	33 (VIOLIN)
CH 04	51 (PIANO 2)

The VALUE ∨∧ keys can now be used to raise and lower the channel to play the timbres assigned to the channels.

At this time,the first channel(CH 01) is called the basic channel. The basic channel can be changed by returning to the POLY mode, changing the channels, and then switching power ON while holding the SOLO key. When the basic channel is set to 05, for example, the timbres in the MONO mode are assigned to channels 05, 06, 07, 08. Setting a basic channel of 10 assigns timbres to channels 10, 11, 12, 13.

(4) INDIVIDUAL CHANNEL VOLUME SETTINGS

The volume for each channel can be individually adjusted to one of nine levels (L0 ~ L9). Setting volume to L0 results in no output.

The volumes for the sample timbres input for the previous example will be set as noted in the table.

CHANNEL	LEVEL
CH 01	5
CH 02	8
CH 03	9
CH 04	7

Starting with CH 01, press and hold down the MDI CH key and use the VALUE ∨∧ keys to set the volume to L6.

Release the MIDI CH key and press VALUE ∧ to advance to CH 02. Set the value using the same procedure as outlined above. Proceed on to CH 03 and CH 04.

(5) PORTAMENTO ON/OFF

The PORTAMENTO ON/OFF status can be individually set in the MONO mode for each channel.

Enter the MONO mode, select the desired channel using the VALUE key, and then set portamento to ON or OFF.

CH 01	ON
CH 02	OFF
CH 03	OFF
CH 04	ON

- The LED above the SOLO key is normally lit in the MONO mode.
- The MONO mode can only be exited by switching the power of the keyboard OFF.
- Pattern memory and song memory operations cannot be performed in the MONO mode.
- In the MONO mode, notes written using the PD sound source cannot be sounded. Only PCM rhythms can be sounded.

(6) MIDI ON/OFF, CLOCK INT/EXT

The controls for the proceduresoutlined below are located on the back pane of the unit.

•The MIDI ON/OFF switch is used to select whether or not all MIDI messages are communicated.

ON: All MIDI messages available with CZ-230S communicated.
OFF: No MIDI messages communicated.

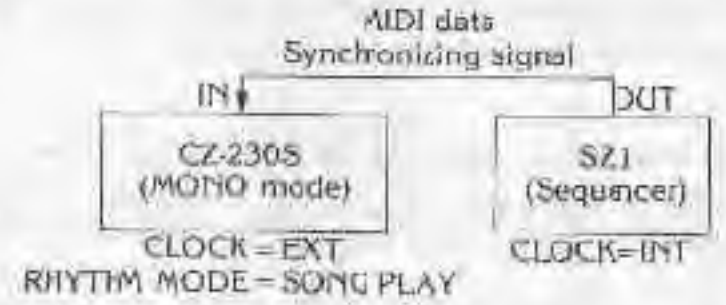
•The CLOCK INT/EXT switch selects which unit is master and which is slave for MIDI CLOCK, START, STOP, CONTINUE START real-time messages for MIDI communication between MIDI instruments.

INT: CZ-230S master, other unit slave (INT = INTERNAL)
EXT: Other unit master, CZ-230S slave (EXT = EXTERNAL)

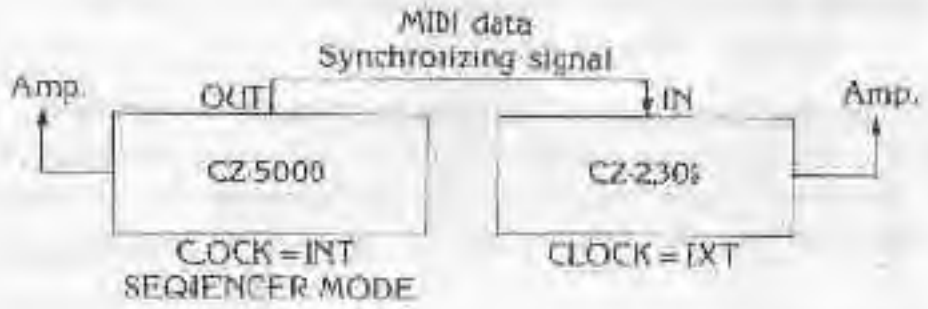
For pattern memory (4/4 or 3/4) and song memory in the rhythm mode, MIDI is OFF and CLOCK is INT regardless of the position of the switches.

(7) SAMPLE CONFIGURATIONS

①Connection with SZ-1 for automatic play of 4voices + drums.



②Connection with CZ-5000 (with built-in sequencer) for use as external sound generator and drum machine.



■ CARE OF YOUR UNIT

1. Avoid heat, humidity, and direct sunlight.
Do not overexpose the unit to direct sunlight, place it near a heater, or in any area subject to high temperature.

2. Severe impacts can result in malfunction.
When carrying or transporting the unit, protect the keyboard and buttons by packing with soft cloth.

3. Keep the unit free of liquids, dust, particles, etc.
Do not allow foreign matter to enter between the keys. Be especially careful of metallic objects such as hairpins, sewing needles or coins. Also, do not allow the unit to get wet.

4. Never attempt to modify any part of the unit.
Your keyboard is a precision musical instrument made up of sophisticated electronic parts. Any modifications of, or tampering with internal components can cause trouble or malfunction.

5. Do not use lacquer thinner or similar chemicals for cleaning.
Clean the keyboard with a soft cloth dampened with a mild detergent solution. Soak the cloth in the detergent solution and squeeze it until almost dry.

6. Remove batteries before extended storage.
Batteries left in the unit for long periods can leak and cause damage to electronic circuitry.

■ SPECIFICATIONS

Model:	CZ-230S digital programmed synthesizer
Keyboard:	49 keys, 4 octaves (mini type)
Sound generator:	PD sound source (phase distortion)
Polyphony:	8 notes (1 ICO) or 4 notes (2 DCO)
Preset voices:	100 (including 4 internal)
Effects:	PORTAMENTO ON/OFF, PORTAMENTO SPEED, PITCH BEND, BEND RANGE
Preset rhythms:	20 rhythms80 patterns (including intro/fill-in)
Rhythm programming:	•Pattern memory: 30 patterns max. (PCM×12, PD×4) •Pattern play •Song memory: 199 steps (measures) max. •Song play
Rhythm operation:	START/STOP, SYNCHRO START, INTRO/FILL-IN, TEMPO (♩ = 40–256)
Tuning:	A4=442Hz ± 100 cents (± 1/2 tone)
Other:	TRANSPOSE (G–F#), SOLO ON/OFF
MT:	Pattern/song data SAVE/VERIFY/LOAD
MIDI:	Poly mode (MODE 3)/Mono mode (MODE 4) Basic channel: 01 – 16 Number of voice channels:4 (MONO mode) MIDI ON/OFF CLOCK INT/EXT
Audio terminals:	LINE OUT(PD/PCM), PHONES
Control terminals:	MT, MIDI (IN/OUT/THRU)
Power suppy:	•Batteries: Six D size dry cells (operation/memory back up) *Battery life: 3.5 hours (main power supply), 1 year (when AC adaptor used) •AC: 100, 117, 220, 240V (optional AD-5 adaptor) •Car battery: Optional CA-5 car adaptor Auto power off (approximately 6 minutes), forced power off
Speaker:	12cm dia.×1
Power consumption:	9.1W
Dimensions	806(W)×206(D)×76(H)mm
Weight:	3.9kg (incuding batteries)
Accessories	Six D size dry cells, MT connecting cord

All designs and specifications subject to change without notice.

GUIDELINES LAID DOWN BY FCC RULES FOR USE OF THE UNIT IN THE U.S.A.
(not applicable to otherareas).

This equipment generates and uses radio frequeny energy and if not installed and used properly, that is, in stict accordance with the manufacturer's instructions, may cause interference toradio and television reception. It hasbeen type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Suppart J ofPart 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- reorient the receiving antenna
- relocate the computer with respect to the receiver
- move the computer away from the receiver
- plug the computer into a diferent outlet so that computer and receiver are on different branch circuits

If necessary, the user should consult the dealer oran experienced radio/television technicun for additional suggestions. The usermay find the following booklet prepared by the Federal Communications Commission helpful: 'How to Identify and Resolve Radio-TV Interference Problems'. This booklet is available from the US Government Printing Office, Washington, D.C., 20402, Stock No 004-000-00345-4.